NNSA's Mo-99 Topical Meeting

Santa Fe, NM

Dec. 6, 2011

GE Hitachi Nuclear Energy

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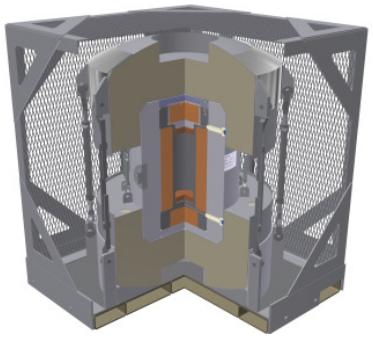
NEPA Review

Reactor (research or BWR) irradiation ^{98}Mo to ^{99}Mo



Shipping

^{99m}Tc Generator Manufacture

Molybdenum Life Cycle

Mo Target Preparation

Patient Application

Compounded by pharmacist for use

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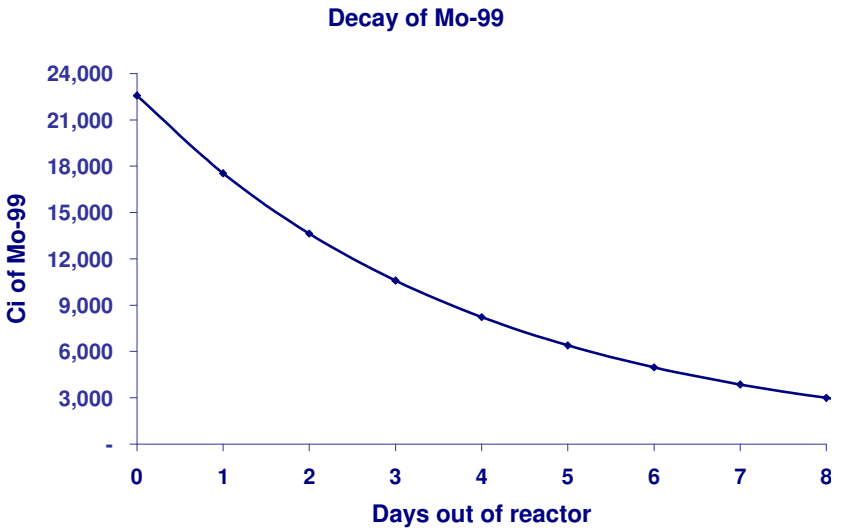
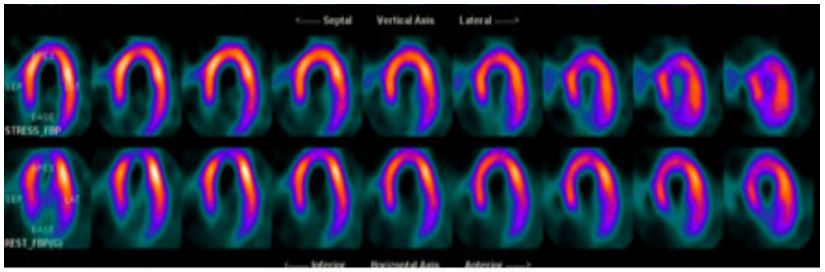
GEH's ^{99}Mo production goal

- GEH Goal...Produce up to 3,000 6-day Ci of ^{99}Mo/week which equals ~50% of domestic demand
- What is a 6-day Curie?...Amount of curies due to ^{99}Mo six days after the Tc generator is on manufacturer's shipping dock
- Short Half Life...Allowing two days for transport and generator fabrication, approximately 23,000 Ci of ^{99}Mo is required upon removal from reactor
- Manageable Mass...Specific activity required activation of approximately 25 kgs of Mo every week .





Myocardial perfusion SPECT – stress/rest

Myocardial perfusion SPECT- stress/rest scan in a patient with dilated cardiomyopathy.

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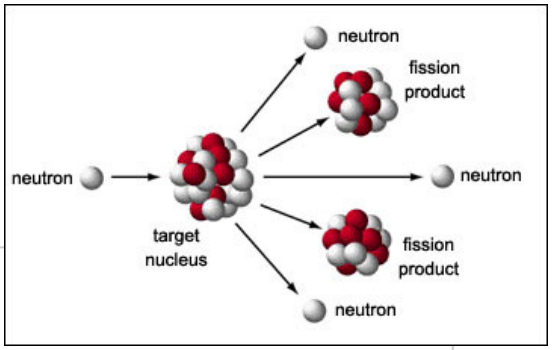
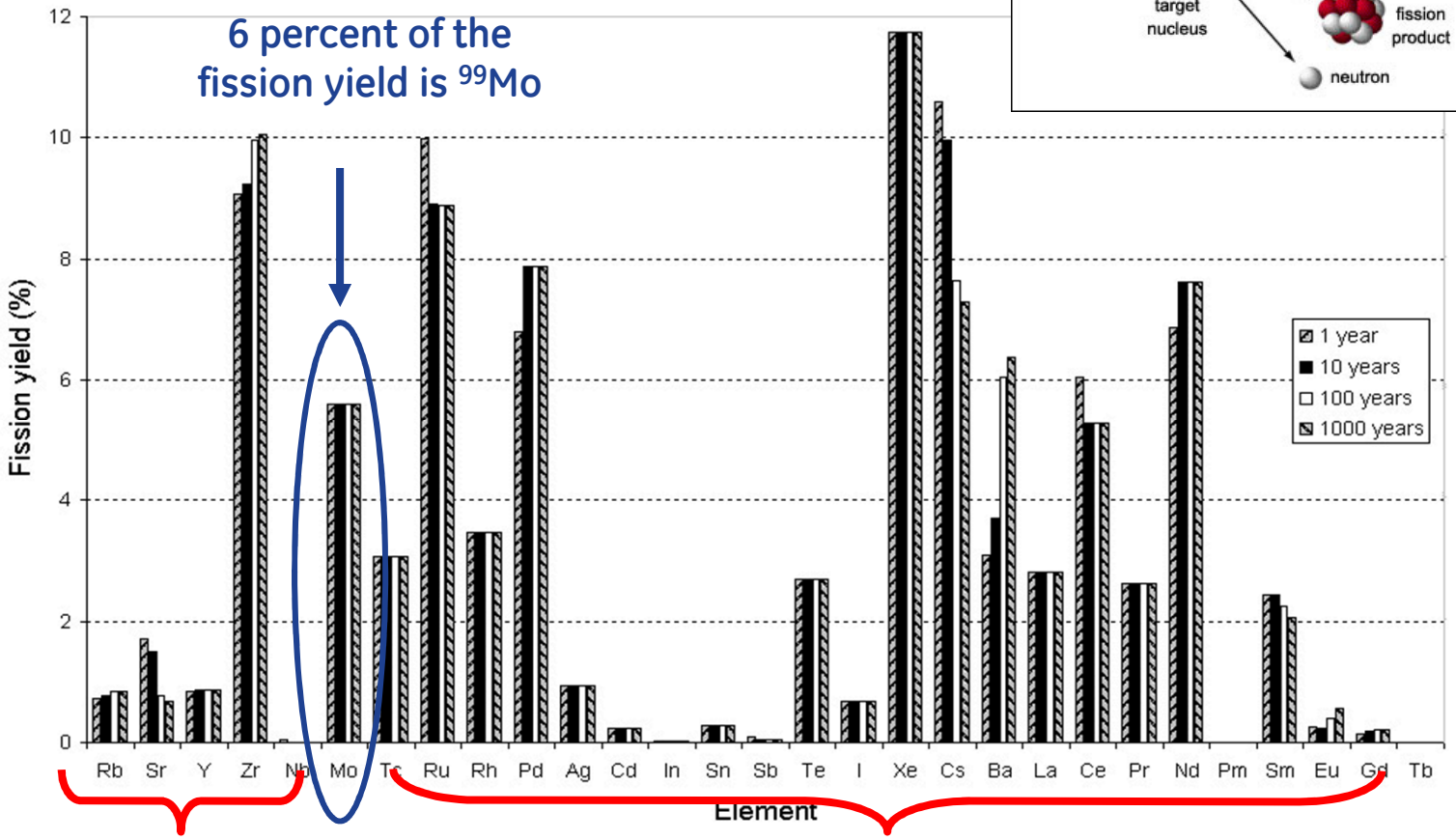
How is ^{99}Mo currently produced?

Currently Produced by Fission of Highly Enriched Uranium Targets





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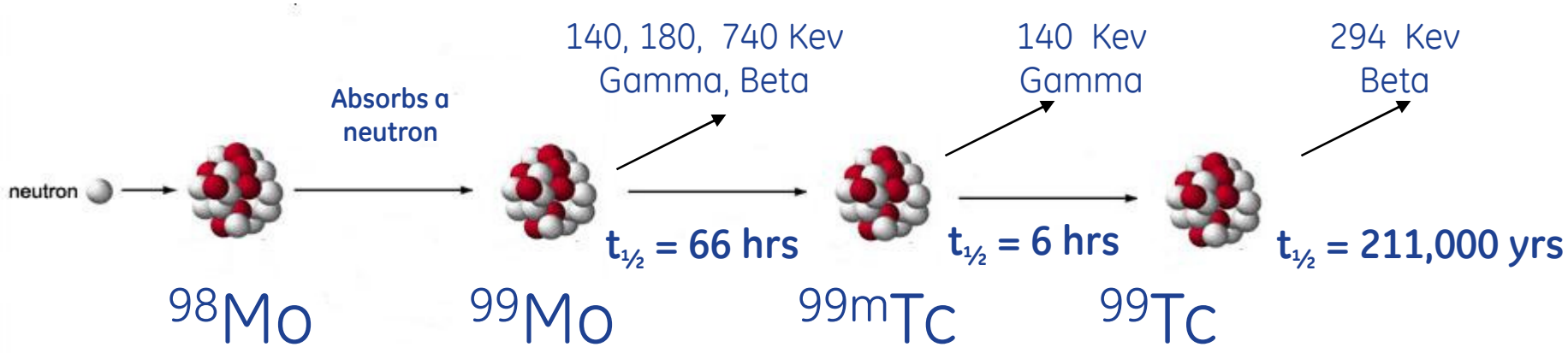
GEH method to produce ^{99}Mo

GEH process uses neutron capture to produce the parent of ^{99m}Tc from ^{98}Mo



^{98}Mo	^{99}Mo	^{99m}Tc	^{99}Tc
42 Protons	42 Protons	43 Protons	43 Protons
56 Neutrons	57 Neutrons	56 Neutrons	56 Neutrons
98 = Atomic Wt	99 = Atomic Wt	99 = Atomic Wt	99 = Atomic Wt

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GEH's process advantages

	Traditional Method	GEH Method
Target Composition/National Security	High Enriched Uranium	Natural Molybdenum
Waste/Environment	High Level Radioactive Waste	Low Level Radioactive, not Hazardous (RCRA) waste
Chemistry	Complicated separations of Mo from Uranium	Simpler process, no uranium complications
Supply Reliability	Unreliable supply	BWRs (>90% CF) produces reliable supply
Cost	Requires new build	Leverages current infrastructure

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Benefits of ^{99}Mo project

- Saves lives…Consistent supply of important medical isotope for the U.S.
- National Security…Allows White House to achieve their goal of producing molybdenum-99 without the use of HEU
- Environmentally Favorable…Generates U.S. imaging medical isotope supply without creating HLW
- Asset Utilization…Provides important medical isotope without the need for new reactors, while leveraging proven and licensed equipment

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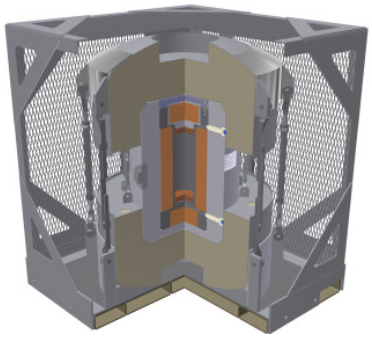

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